



# VEE LINE

NUMBER 97

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## DIRECTOR'S CORNER

I want to apologize to all of you for that last ballot. I had a pretty good idea, after going through those punch cards, what was going to happen. There were so many variations of opinion on the many items involved that it was pretty obvious, even then, that a list of rules which would be acceptable to *everyone* would be impossible to compile. However, we were committed to a single ballot, by then, so that's what you got.

I did hope that more of you would indicate approval, in general, but show on the "comment" section the item or items you couldn't accept, rather than let the entire ballot go by without voting at all, but our ballots have always been simply for the purpose of giving you a chance to express your opinions, and that's what you did.

Outside this organization the format of the ballot, or the consensus shown by it, wouldn't have made any difference anyhow, as you'll note elsewhere on these pages. Nevertheless, I'm sorry I didn't stick to the original style so you'd at least have had a better chance to express your opinions, with probably a lot less anguish about the decision you were making.

No, we won't have any more rules ballots. If SCCA doesn't want to know what you're thinking, it's an exercise in futility. If they ever decide they do want to know—let *them* furnish the ballots and conduct the voting.

### OOPS! WE HIT A NERVE!

"Dear Don—I have just received the Sept. issue of "VeeLine" and read your column, "They Did It Again!" My response to you is, "So You Have Done It Again!"

"Typical of the irresponsible information you have published in "VeeLine" for some time, now, you blithely go again and announce "SCCA rules for 1973". If you will think very carefully, you will remember I told you on the telephone the morning after our Ad Hoc Committee meeting that the suggestions of that group would require ratification by not only the Competition Board, who they were asked to advise, but also the Board of Governors.

"The Competition Board has met and did not adopt the recommendations of the Ad Hoc Committee in total. The Governors will not meet until next week. So very clearly, the 1973 rules have not been finalized!

"Despite this, you have undoubtedly misled a great many Formula Vee competitors with your comments.

"I am very pleased to see that there will be no more rules ballots. It appears that you have, at last, realized that Formula Vee competitors are sick and fed up with your continual hunting for loopholes, half suggested legal modifications, and continual griping about SCCA.

"What does surprise me is that it has taken this long for you to have finally gotten the message.

"Yours Sincerely, Bob Tomlin,  
Director of Club Racing"

Whatever else you may say about the "typically irresponsible information" in

*the VeeLine, you will have to admit that we don't restrict the letters we print to only those which are complimentary! We welcome constructive criticism!*

*You do have a valid point, Bob. I SHOULD have mentioned that the rules still had to go through the Competition Board and the Board of Governors before becoming the official final version of the '73 rules. However, after going through this eight times previously, it seemed a safe bet that they would merely be rubber stamped "OK", with perhaps a minor change in wording, by those bodies. (I'll bet a buck the change they made was to drop the "stock VW fan belt" requirement?)*

*Only once do I remember an actual change being made in the recommendations of the Car Classification Committee ("Ad Hoc Committee"?) and that was due to the fact that the VeeLine carried the news of the proposed change to the members in time for their protests to be heard by the Board of Governors before final adoption. Frankly, I hoped that might result again, this time.*

*I must compliment you on your frankness and honesty in expressing your opinion of our rules ballot. Everyone else in the hierarchy of SCCA has always said, "We really do appreciate the guidance of your ballots and look forward to seeing them. We do! We do!" You are the first official with guts enough to say right flat out, "I don't give a damn WHAT the competitors think!"*

*THAT's the message it has taken me so long to get!*

## MORE TROUBLE SHOOTING

(Continued from last month)

Let's see—where were we when we ran out of space last month? Oh, yes—we were still checking ignition.

You've checked out everything, but still you don't get any action? Well, you have checked *nearly* everything. Do you have a tach wire connected to the distributor terminal, or anywhere else in the ignition wiring? Try that with your test light—one wire to a "hot" terminal, and the other to the tach wire, disconnected from everything else. If you get just a faint hint of a glow in your test lamp, that's natural, but if the lamp really lights up you are grounding your ignition circuit somewhere in the tach circuit—either a bare wire grounding to the frame somewhere, or perhaps inside the instrument itself.

One more possibility, would be wiring too light for the job, or just loose connections somewhere, which would conduct enough current to pass these tests, but which, with the starter engaged, just wouldn't furnish enough to do the job. It won't tell you for certain, but it will give you a clue, if you connect the lamp between the No. 1 terminal on the coil (with the distributor wire removed) and a good ground. If the light goes dim when the starter is being used, your problem is "not enough", rather than "none". Try a "hot line" directly from the positive terminal on the battery to the #15 coil terminal, as a double check.

There's one more condition you might encounter—you *do* get a spark from the coil, but it is only willing to jump a short gap. It will jump across the gap of a spark plug laying on the engine, but only with a small redish spark, but won't jump much farther than that when the center wire is disconnected and placed near a ground. This is a pretty good indication of a faulty coil—one in which the secondary windings are shorted so that only a portion of them are actually in use. Usually, but not always, there will be at least enough fire to cause a few explosions, or even to run the engine faultlessly at low speeds, with cutting out as higher speeds are reached. If you find this condition, or just aren't satisfied with the quality of the

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### The VEELINE of FORMULA VEE INTERNATIONAL

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## MEMBERS' SOAPBOX

"Dear Don—Your troubleshooting article in the Sept. VeeLine was very comprehensive, but there is one possible source of fuel feed trouble which wasn't mentioned. A clogged fuel tank vent can stop fuel flow just as effectively as a plugged line or malfunctioning pump, and usually it isn't the sort of thing one thinks to check. I found that one out the hard (and embarrassing) way!

George Bell, Lancaster, Cal."

Good point, George! This can be very hard to find especially if there is just a slight air leak around the cap, so that the situation heals itself, temporarily, in a few minutes. With no venting at all, the symptoms will probably be a collapsed gas tank, as the pump sucks out the gas and leaves a vacuum.

"Dear Don—What is "Bump Steered"? How is it done?

I realize that the legal gears are in the GCR, but what are the best combinations for long and short tracks?

Robert Morris, Muncie, Ind."

I know what you're referring to, and it mystifies me, too. Bump steering, of course, is the effect of bumps, camber changes in the road, roll of the car in a corner, etc., on the steering geometry, including any steering effect exerted by the rear suspension. The term seems to be most often used in ads for used cars, as though it were something beneficial.

I'll have to plead ignorance in regard to anything good about bump steering, but maybe there is something to be said about it that I don't know. (Comments are certainly welcome!) I'm also a diehard in regard to the need for Ackermann effect on a race car, too, with a good deal of opposition. However, even though there are a number of cars which can pass Pezunia on a straight, no one has ever complained about her getting in the way in the corners, so we'll stick to near-perfect Ackermann, neutral "bump steering" and all the other conventional conceptions of suspension, until they do.

The most obvious example of bump steering is still sometimes seen in a car with a long extension on the steering gear arm, and with that arm considerably above or below the level of the arms on the spindles. When the driver gets in the car, or when the front end is pushed down, the level of the tie rods changes and the effect is to push or pull on the arms on the spindles, changing the amount of toe-in considerably. I've seen as much as a half-inch of change made by pushing the front of the car down about three inches.

If the initial setting is with the center higher than the spindles, the first effect is to increase toe-in. When the tie-rods are level this is at its maximum, and as the car is lowered further, so that the tie-rods slope up from the middle, the change is back toward toe-out. If you have this type of set-up, the best bet is to have the center

slightly higher at normal riding height, so that the application of the brakes, and the resulting nose-dive, will cause the rods to level, and then perhaps attain the same degree of slope downward toward the middle, at which point the original amount of toe-in will again be present. A bump which would raise the front wheels rapidly would, of course, exert the same effect as braking.

The rear wheels, too, change their toe-in adjustment with changes in the load or other conditions (bumps) which compress or relax the coil springs. They don't just flap up and down, as though hinged at the transmission ball joints, when bumps are encountered. Each one "hinges" around a line drawn through that ball joint and the one at the front of the trailing arm. The "hinge" line, then, is diagonal to the center line of the car, rather than parallel to it, so that as the wheel goes up and down, some change is also made in the direction it is rolling. The shorter the trailing arm, and the farther outboard its ball joint is located, the more pronounced this effect will be. (The Autodynamics D-13, with the ball joint well forward and located very close to the fore-and-aft line running through the transmission joint, is a very good example of keeping this effect to a minimum.) One theory is that mounting the trailing arm joint lower on the frame than the transmission joint will tend to neutralize this effect.

Back in the good old days, when we didn't have "camber controlling devices" and ran with perhaps ten degrees of negative rear camber in an attempt to prevent "tucking under", a change of a degree or two in camber (due to a bump, or centrifugal force in a corner) could make a definite change in the rear end geometry. However, with today's longer trailing arms, and the near-neutral camber settings, it is doubtful that normal fluctuations in riding height—an inch or two—have any detectable effect on rear-axle steering. If you have any doubts, check your rear toe-in with the car empty, with the driver in the seat, and then with an extra passenger standing on the rear. Run one front wheel up on a block three or four inches high, to simulate roll in a corner, and check the alignment of the rear wheels—not just toe-in, but the direction in which they are pointing. Chances are, you'll find that changes, if any, are negligible.

Ideally, any change, especially if induced by roll effect in a corner, should result in increased toe-in on the outer rear wheel. If it results in toe-out, that contributes to "oversteer" in the engineering (not racing) sense of the word. The rear wheel, as it starts to point outward, swings the rear of the car outward, increasing the "turning effect" beyond that which was originally induced by the steering wheel. This requires reducing the amount of "turn" in the front wheels, which reduces

the amount of roll, which reduces the amount of "bump steer", which straightens the car out somewhat, which requires more turn in the front wheels again, and so on. On the other hand, if toe-IN is induced in the outer rear wheel, this requires merely a bit more effort on the steering wheel, and a balance is easily reached.

We've gone into steering and suspension geometry in more detail in some of the previous issues, but I don't recall ever discussing it in terms of "bump steering" before. If there are any contributions to this subject, we'll be glad to print them.

As to gear ratios, the sedan gearing which you are probably using is undoubtedly the best for short tracks, where acceleration is the name of the game. That's the "tunnel case" transmission with either the standard gears or the "transporter" third gear. On longer tracks, and using the new small tires, some of the "pros" are using the "split case" transmission which has somewhat higher gearing. On a track with really long straights, even the straight transporter transmission might be in order. As Robert Morris said in his letter, you lose something when you gain something. Lower gear ratios will give you more acceleration, but on a long straight you may run out of revs. High gearing will eventually give you more top speed, but it will take longer to get there. I know that's not a very definite answer, but there really isn't any.

## MORE TROUBLE SHOOTING

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spark, try borrowing another coil before you go out and buy one, and before you go through all the rest of this stuff.

Any time you find anything out of the ordinary—any time you make a change, or tighten a connection, or replace something, try the coil check—the center wire to ground, with a 3/8" gap. If you've come this far and still haven't been able to get a spark, about all that is left is a new coil. However, now you know that you need it. There's a universal tendency to suspect the coil (or condenser, or both) at the first sign of ignition trouble, but generally they're both pretty reliable, and should be at the bottom of the list of possible solutions.

If all these possibilities have been checked and the engine still won't run, there's only one more check left, and it probably won't do anything for your morale. Are you sure you matched the timing marks when you installed the camshaft? You didn't have to lift the crank again to align the bearings, or remove the cam to install forgotten cam followers? You're not sure? OK, better check it out.

Make a mark 7/8" to the left of the right hand (10 degree) timing mark on the crank pulley. Set your intake valve clearance on No. 1 cylinder to .040" (that's 40 thousandths—not four). Turn the engine in the normal direction, and

the valve should just start to open when the mark reaches the crankcase joint.

If it starts moving when the first notch lines up with the joint, your cam is advanced one tooth off the timing marks; if it's 7/8" after the mark you just made, it's retarded by one tooth. More than that? You *really* goofed! The engine will run fairly normally with the cam one tooth off in either direction but it will have either low-end torque, but limited top speed, or vice versa.

If you've gone through all this and now have "fire"—lots of nice noise and smoke, but still no run (or if that's where you're starting from) go to Square #2. It's labeled "Firing order and timing".

Take off the number 1-2 valve cover and turn the engine over until both of the #1 rocker arms are loose (with whatever clearance you used when you adjusted them) and stop when the first notch on the crank pulley lines up with the split between the crankcase halves. If you did this before you dropped the distributor drive gear down the hole, the rotor now should point to about two o'clock, if you visualize the distributor case as a clock face, with 12 o'clock at the top.

If it doesn't, don't start tearing the engine down, or even relocating the distributor gear. Just turn the distributor body enough so that the rotor points directly at one (any) of the terminals in the cap, and call that "No. 1". (If the condenser gets in the way, turn it the other way to the nearest terminal.) If you didn't also forget to march up the timing marks on the crank and cam gears when you started assembling, the engine will never know the difference.

OK, run the lead from whichever terminal the rotor is indicating to #1 plug. Going clockwise, the next one is #4, then #3, and the last one is—right! Number 2! (Or start at the terminal next after the rotor and count, "4-3-2-1"). If the wires won't reach, swap them around in the sockets so they will—it won't work if you just select plugs they can reach.

Setting the ignition timing is pretty basic but you might pick up something you didn't know if you're new at this. The best way to set it, of course, is on a dyno. Next best is to try very small adjustments at the track, keeping track of top rpm you are able to attain, lap speeds, or anything else in order to evaluate your changes. However, if you've just assembled your engine you have to start somewhere, which is very close to the stock VW setting.

Turn on the ignition and connect one lead of your test lamp to the terminal on the distributor and the other to a good ground. When the points are open the lamp will light up—when they are closed the juice will go to ground through the points and the lamp will go out.

Turn the engine over with a wrench on the crankshaft nut, slowing to a crawl as

the first notch on the pulley approaches the split line in the crankcase. The spark is created when the points open (not when they close) and the lamp comes on. For a start, this should be perhaps an eighth of an inch before the notch lines up with that split.

Don't buy or borrow an expensive pistol-type timing light for this purpose. Don't use one, even if you already have one. With the engine idling very slowly, before the centrifugal advance mechanism starts to operate, you *might* get the same general reading that you will with a static lamp, but don't count on it. If you're using the vacuum advance distributor, that's a different story—see your VW manual, and then get a centrifugal type for racing purposes.

If your engine is running pretty well, but misses intermittently, or on one cylinder, this item would probably come first—spark plugs. Remove all four, reconnect them to their leads, and lay them on the engine so you can observe the gaps while the engine is being turned over. A spark should show somewhere, if everything else is in order—either at the gap, where it is supposed to, or back along the center insulator (if the plug is fouled) or right through the porcelain if it is cracked. If you find a plug which doesn't show a normal spark, try a new—or different—plug on that lead. If still no spark, it's likely that your spark plug wire is faulty. This is pretty hard to detect, but you can switch it with the other one of the same length and see if the trouble goes along with it. (If you still have the original VW resistor-type wiring, don't bother with anything else until you have replaced it with solid wire!)

That didn't help? You're probably at the point where you'd save time by taking the distributor cap and rotor, and the high tension spark plug wires to your VW dealer or an "auto electric" shop, and have them checked for leaks and resistance. However, if you're short on time and/or cash there is one more rough check you can make, yourself.

Check the rotor for leaks by holding the center wire from the coil close to the center of the rotor while the engine is being turned over. If a nice spark jumps to the rotor and disappears, it may be going to ground through a crack in the material. If it runs down the outside of the rotor to ground, the rotor may be damp or dirty. The spark should be quite reluctant to go to the rotor at all if it's in good shape.

You've got the engine running fine, now, up to 4000 rpm, or so, but then it starts cutting out? It's highly unlikely, but check, anyhow—does the fine print on the base of the coil say "6V—or "12V"? If it's 12, try a 6 volt coil. Improvement guaranteed!

Jetting is a possibility, too. Probably the main jet is not at fault, if you get good low and medium speed response, but the

air correction jet, if too large, could be leaning out the high speed mixture. Extra fuel is also supplied at high speed through the accelerator pump system. However, if you get a squirt of gas each time the throttle is opened you can assume that it is working properly at high speeds, too.

If you're using a centrifugal advance distributor (and who isn't?) and have puzzling variations in power while under way, or have an appalling lack of power at high speeds, take the cap off and try turning the distributor rotor. You should be able to turn it a few degrees clockwise against a definite spring tension which should return it to the original position. If it turns back and forth easily and stays where you leave it, the spring on the advance mechanism is broken. If it doesn't turn at all, the weights and stuff are rusted tight. It shouldn't happen, but if crankcase fumes can get up past the shaft into the housing, they're pretty corrosive.

"Valve float" can cause some odd effects at high speed, but they are accompanied by wierd noises and clatterings, and back-firing through the carburetor and stuff, and can be counted on to start at a definite spot on the tach. You probably wouldn't confuse this with anything else.

As was mentioned last month, fuel problems won't necessarily prevent a car from starting, or from operating normally at low speed. The first symptoms may very well be a miss starting a few seconds after the throttle is fully opened, regardless of speed. The fuel pump may be furnishing enough fuel at each stroke to keep the engine operating normally at cruising throttle, but when the throttle is fully opened only that same amount of fuel is supplied, to be mixed with a lot of additional air, causing a leaner mixture.

You can file points and restore them to "as new" condition if they're not too badly worn or burned. In fact you *should* file them—or replace them—if there's any sign of a "peak" on one point and a matching "pit" on the other. The height of that "peak" is added to the thickness of your feeler gauge when you set the points, so that the actual clearance may be considerably greater than you think you're getting. If one of the points is the hollow center type, peaks and pits seem to be less of a problem, but the entire matching surface may be worn off at an angle, giving the same effect.

Actually, there's a better instrument than a point file for this purpose. Ask your parts dealer (not VW) for a "Flex Stone". He may have some other brand, but it will be a very thin flexible strip of abrasive, about half an inch wide and five inches long.

With the distributor shaft turned so that the fiber rubbing block is opposite one of the flats on the cam, adjust the points so that the block just barely touches the cam. Then, when you insert the flex

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**MORE TROUBLE SHOOTING**

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stone between the points they will still exert pressure on the stone. If you stone them in their normal operating position the points will be parallel to each other with the stone between them, but will touch only at the outer ends when it is removed and they are brought together. In actual practice, it is probably humanly impossible to get a set of points to contact over the entire matching surface—chances are about a million to one that there will be only one tiny spot actually conducting current. However, if that spot is somewhere near the center of the points there will be better heat conduction, and if nothing else, it will look better. Don't worry too much, then, about rocking the stone as you use it. If it's moved around a bit you'll end up with the surfaces slightly rounded, and the contact point in the center. After you're through, and have the points set, insert a small scrap of clean hard paper between the points and pull it out with the points under pressure against it. This will remove any particles of metal or of the stone which might remain.

A word about condensers in general, for a moment. Even though it is common practice to replace condensers every time points are replaced, it's a racket! If a condenser lasts a hundred miles, it will almost certainly last a hundred thousand! Modern epoxy-sealed condensers don't wear out or get weak or deteriorate in normal use. If you find that a set of points lasts an unusually long time, possibly even *wearing out*, instead of burning, guard that condenser with your life! On the other hand, if your points burn up rapidly, keep changing condensers until you find one which does match up with your coil. Without going into a lot of theory, a condenser acts somewhat like an air chamber in a water line. It absorbs the surge when the points open, and feeds it back into the circuit when they close. If its "capacitance" is just right—matches the rest of the components—there will be very little arcing, and burning, as the points open. If it doesn't match, the

points will arc and a pit will form on one and a peak on the other. This can be in either direction, depending on whether the condenser is too "strong" or too "weak".

**FOLLOW THE LEADER?**

In New Zealand, Formula Vee got off the ground a little slowly, but has caught up, percentage-wise, if not in overall numbers, with the rest of the world. The first Vee in that country was built by Barry Munro, using his own plans and a "fiber-wool" body. That's right—wool cloth, rather than glass mat, was the material used in the body panels. (Race drivers aren't the only export of that country, you know!)

In New Zealand, as in Australia, their National racing body (MANZ) adopts without question the rules recommendations of the Formula Vee Association, which are determined through a ballot similar to ours.

Generally speaking, their rules are about the same as ours. The three most obvious exceptions are the use of *two* standard Beetle carburetors on free manifolds, wide-rim wheels—and weight-with-driver 1000 lbs. (800 lbs. empty). They don't know that that's "not in the spirit of racing" (according to our officials).

But what would they know about the spirit of racing in New Zealand?

**FORMULA VEE SCRUTINEER'S HANDBOOK**

It has been mentioned several times on these pages that Frank Schultheis has been working for several years on a complete handbook on Formula Vee, principally for use by scrutineers checking Vees for legality. It has now been completed. It has not been officially recognized by SCCA, and probably won't be, since they didn't compile it, but most scrutineers will be using it as a "bible", regardless, since it is the only collection of its kind of facts and figures relative to Formula Vee.

Serious competitors will find it invaluable, too, since it defines in many areas the absolute limits of preparation which will be considered legal, draws attention to

several little-known preparation "secrets" which may be encountered (legal and illegal) and, while that is not its actual purpose, pretey well spells out what will be found in a top-performing Vee.

Frank is hoping to recover at least the actual cost of preparation by selling this 50 page book to Vee owners, as well as to Vee scrutineers. The price is \$6.00. The address is "Tech Inspection Consultants, 1279 Ashcroft Lane, San Jose, Ca. 95118".

**UNCLASSIFIED ADS**

**FOR SALE:** Zink, recently completely rebuilt. Strong fresh cam-bearing engine, some spares. \$2200 (negotiable). Trailer available. Don Fujimoto, 13738 Beach St., Cerritos, Cal. 90701, (213) 926-6720.

**FOR SALE:** '70 King Vee, never bent. Hyd. clutch, Z-bar, Smith's instruments, lowered front end, Goodyears, new wheel bearings, front suspension parts, brake cylinders. Two schools, 4 races, since new. Without engine, \$1050; with stock 40 HP engine, \$1200 or best offer. Will deliver reasonable distance from N.Y.C. Tony Spiridigliozzi, 138 Primrose Ave., Mt. Vernon, N.Y. 10552, (914) 664-1152.

**FOR SALE:** Autodynamics MK 5. '72 points Champ, SoPac Div., with average driver. 12 mounted Goodyears, trailer, misc. good and new parts, \$2300. Also spare engine with new selected and blue-printed parts from case up, \$800. Ernie Rolston, 1607 W. Dell Circle, Mesa, Ariz. 85201, (602) 969-3746.

**WANTED:** Vee kit, new, unassembled, less VW components. Any model, not over \$700. \* M.M. Racing, 3754 Maple Ave., Northbrook, Ill. 60062, (312) 272-6799.

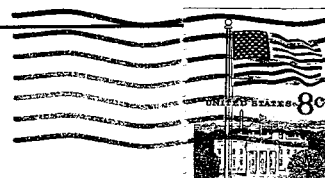
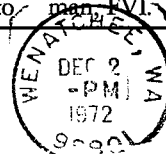
**FOR SALE:** Show-and-go Zink, with Zink engine, all chrome suspension, scroll-work paint job, etc. Have \$4000 invested, would like to convert to money. Rick Marshall, 2063 Gordon Ave., Menlo Park, Cal. 94025.

**WANTED:** One-piece main shaft for ball (not needle) inner bearing to fit split trans case #113 301 102A. Don Cheesman, FVI.



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